

REMARKS/ARGUMENTS:

Minor changes are made to this specification. Claims 3 and 4 are canceled without prejudice. Claims 1 and 5 are amended. Support for the amendment to claim 1 can be found in canceled claims 3 and 4. Support for the amendment to claim 5 can be found in paragraph [0037] of Applicant's specification. Claims 1, 2, and 5-25 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

SPECIFICATION:

The title of the invention is objected to because the Office contends that the title of the invention is not descriptive. The Office is requiring a new title that is clearly indicative of the invention to which the claims are directed. Applicant respectfully disagrees that the title is not descriptive. However, Applicant has re-written the title in order to avoid delays in prosecution of the instant application. Specifically, the new title is as follows: MULTI-LAYER PIEZOELECTRIC ELEMENT. Withdrawal of the objection is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. §102:

Claims 1-3 and 5 stand rejected under 35 U.S.C. §102(b) as being anticipated by Yokoyama (U.S. Patent No. 6,381,118).

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Yokoyama.

The above rejections are moot with respect to claims 3 and 4 due to the cancellation and incorporation of claims 3 and 4 into amended claim 1. Applicant respectfully traverses this rejection as to amended claims 1, 2, and 5.

Claim 1, as amended, is as follows:

A multi-layer piezoelectric element comprising:

a stack having an active portion constituted from at least one piezoelectric layer and a plurality of internal electrodes consisting of the first and the second internal electrodes placed one on another, the active portion being subjected to expansion and contraction in response to a voltage applied across the first internal electrode and the second internal electrode; and

external electrodes formed on two side faces of the stack, one of said external electrodes being connected to the first internal electrode and the other of said external electrodes being connected to the second internal electrode,

wherein each of the external electrodes has three or more layers including a first layer containing a metal oxide and formed in contact with the side face of the stack, a second layer containing a metal oxide and formed on the first layer, and an outermost layer containing a metal oxide,

wherein a content of the metal oxide in the first layer is more than a content of the metal oxide in the second layer, and the content of the metal oxide in the second layer is more than a content of the metal oxide in the outermost layer.

Applicant respectfully submits that Yokoyama cannot anticipate or render claim 1 obvious, because Yokoyama fails to teach or suggest that "each of the external electrodes has three or more layers including a first layer containing a metal oxide and formed in contact with the side face of the stack, a second layer containing a metal oxide and formed on the first layer, and an outermost layer

containing a metal oxide, wherein a content of the metal oxide in the first layer is more than a content of the metal oxide in the second layer, and the content of the metal oxide in the second layer is more than a content of the metal oxide in the outermost layer.”

Yokoyama teaches a third electrode layer (13c) which corresponds to the outer most layer. However, as acknowledged by the Office, the third electrode layer (13c) does not contain a metal oxide. In addition, Yokoyama teaches that the second electrode layer (13b) is made of nickel. However, the second electrode layer (13b) similarly, does not contain a metal oxide.

In contrast, each of the first, second, and outermost layers of the present invention contain a metal oxide. The content of the metal oxide in the first layer is larger than the content of the metal oxide in the second layer and the content of the metal oxide in the second layer is larger than the content of the metal oxide in the outermost layer. When the content of the metal oxide in the component layers of the external electrode 15 is controlled to decrease gradually in such a manner as the first layer > the second layer > the third layer > ... > the outermost layer, adjacent layers of the external electrode can be caused to have thermal expansion coefficients of proximate values, so as to increase the bonding strength between the layers. (Applicant's specification, at paragraph [0036]).

In light of the foregoing, Applicant respectfully submits that Yokoyama cannot anticipate or render claim 1 obvious, because the Yokoyama fails to teach or suggest each and every claim limitation. Claims 2 and 5 depend from claim 1 and therefore, cannot be rendered obvious for at least the same reasons as claim 1. Withdrawal of these rejections is thus respectfully requested.

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Reply to Office Action of January 25, 2010

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Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Yokoyama in view of Tani (U.S. Patent No. 5,935,485). Applicant respectfully traverses this rejection.

Claim 6 depends from claim 1 and is therefore, patentable over Yokoyama for at least the same reasons discussed above. Tani cannot remedy the defect of Yokoyama and is not relied upon by the Office for such. Instead, the Office cites Tani for teaching a piezoelectric element having inactive piezoelectric layers including dispersed metal to provide a piezoelectric material which exhibits a large electrically induced strain under a strong electric field, to improve the straining ability of the piezoelectric material by optimizing the configuration and state of the dispersed noble metal particles, straining ability which stems from the dispersion of the noble metal particles and to provide a piezoelectric material which effects a good straining ability regardless of a reduced addition amount of noble metal element.

In light of the foregoing, Applicant respectfully submits that the cited references cannot render claim 6 obvious, because the combination of references fails to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310)785-4600 to discuss the steps necessary for placing the application in condition for allowance.

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If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
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Date: May 25, 2010

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